

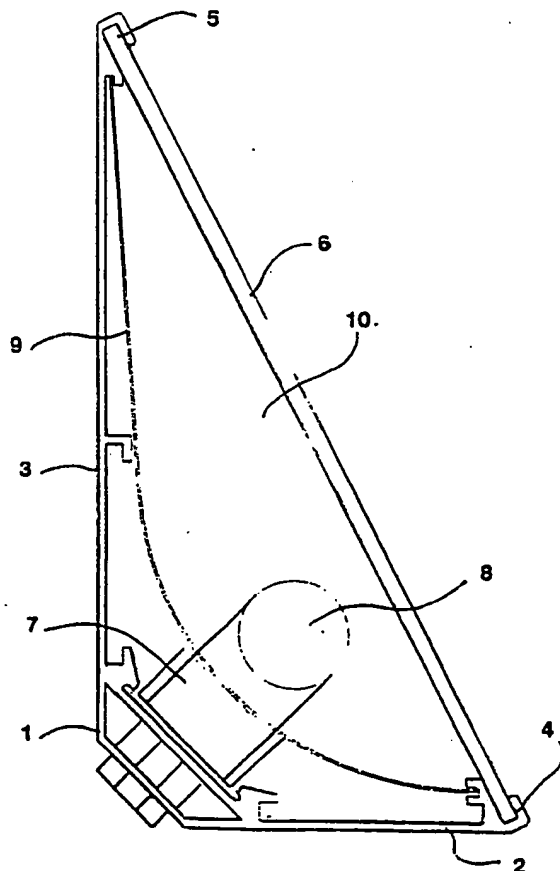


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/DK88/00149 <b>(22) International Filing Date:</b> 9 September 1988 (09.09.88) <b>(31) Priority Application Number:</b> 4729/87 <b>(32) Priority Date:</b> 10 September 1987 (10.09.87) <b>(33) Priority Country:</b> DK  <b>(71)(72) Applicants and Inventors:</b> ERLENDSSON, Gudni [DK/DK]; HJALTASON, Thorgeir, Daniel [DK/DK]; St. Kongensgade 77, 3, DK-1264 København K (DK).  <b>(74) Agent:</b> LEHMANN & REE; Frederiksberg Allé 26, DK-1820 Frederiksberg C (DK).		<b>(81) Designated States:</b> AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), FI, FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), NO, SE (European patent), US.  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Danish).</i>

**(54) Title:** ILLUMINATED SIGNBOARD**(57) Abstract**

An illuminated signboard comprising a housing (1, 2, 3) with a sign plate (6) carrying a text or design and consisting of a UV translucent material comprising a UV non-translucent layer being apertured in the zones corresponding to said text or design, a material which becomes fluorescent when subjected to the influence of UV-light being placed in the zones formed by the apertures and a UV light source (8) placed in the housing. The text or design of the illuminated signboard will appear in bright, strong colours.



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Illuminated signboard

5 The present invention relates to an illuminated signboard comprising a housing with a sign plate made of UV translucent material and carrying a text or design and comprising a UV non-translucent layer, and a UV light source placed in the housing for illuminating the rear side of the sign plate.

10 Signboards are known in which the light source is e.g. a fluorescent tube and in which the sign plate consists of a opaque or coloured plastics plate comprising zones of a semi-transparent, contrast coloured material forming said text or design or on which said text or design is adhered or printed, the text or design being ordinarily  
15 formed from a material being less translucent than the plastics plate itself. The text or design may e.g. be made from a coloured non-translucent adhesive film.

20 When a text or a design is formed from a semi-transparent contrast coloured material, the light emitted from such a signboard will seem "flat". If the text or design consists of a coloured non-translucent film the text or design will appear in silhouette and consequently a coloured text or design may not appear in full colour, especially not in the dark.

25 Front illuminated signboards are known wherein the sign plate comprises zones of a fluorescent plastics material and wherein one or more UV tubes are used as light source.

30 A prior art illuminated signboard of such type consists of a sign plate onto which a text or a design has been applied by means of a coloured adhesive film, strings of a fluorescent plastics material being adhered to the sign plate along the contour of the text signs or the design and in which UV tubes are placed behind screens at the top and bottom of the signboard to illuminate the sign plate from  
35 the front side and thus activate the fluorescent material to emit light.

Such illuminated signboards are not suitable for outdoor use and they do not ensure a uniform UV illumination of the front of the

sign plate. Therefore, the light emission does not become uniform.

US patent No. 2,879,614 describes a signboard with a signboard of a translucent material with holes for fastening carriers of letters and signs to the front of the sign plate and one or more UV light sources situated behind the sign plate. Said carriers consist of a fluorescent material and the letters or signs on the carriers are created by removing proper parts of a non-translucent coating on the front of said carriers. A light filtrating laquer is applied to the rear side of the signboard between the zones in which said letter or sign carrying zones are situated.

The object of the invention is to provide an illuminated signboard of the type described above which is easily produced and on which the text or design is clearly delimited and appears in bright, strong colours.

According to the invention this object is obtained by a signboard of the type described above, said signboard being characterized in that the UV non-translucent layer is apertured in the zones corresponding to said text or design and that a material which becomes fluorescent when subjected to the influence of UV light is placed in the zones formed by the apertures.

Unlike the known illuminated signboard mentioned above, the text or design on the signboard according to the invention consists of fluorescent material situated in zones formed directly in the UV non-translucent layer. This provides a text or design with clearly delimited contours. Furthermore it is possible to avoid undesired light or colour effects which can occur in connection with the known signboard, e.g. caused by light emitted through the space between the carriers or if the carriers do not cover the entire translucent area.

The sign plate of the illuminated signboard according to the invention preferably consists of a UV translucent plastics plate, e.g. a polymetacrylate, polycarbonate or a polystyrene plate.

The UV non-translucent layer which preferably is placed on the front

of the UV translucent plate can be another plastics plate which is laminated with the former, but said layer preferably consists of a coating e.g. in the form of a film, such as a plastics or metal film or a colour layer such as a layer of printer's ink or serigraphic colour.

The zones formed by the apertures are preferably constituted by grooves in the UV non-translucent layer and preferably also extending into the UV translucent plate. Such grooves may e.g. be formed by moulding, optionally by vacuum moulding, or pressing of the sign plate. They may also be formed by cutting, optionally automatic cutting, in a pattern corresponding to the desired text or design. Cutting grooves are easy to make and form clear delimitations of the fluorescent material so that the text or the design appears in clear contours.

The light source of the illuminated signboard according to the invention preferably emits UV light with a wavelength of between about 315 and 400 nm which light is named A light. This light does not have the same harmful effect on plastics materials as B and C light which is light with wavelenghts of between about 280 and 315 nm. B and C light is part of the sunlight and in order to protect the signboard against this light the fluorescent material placed in the zones formed by the apertures is covered on the exterior side with a coating e.g. applied by spraying or lacquering thus preventing penetration from the outside of the harmful part of the sunlight into the UV fluorescent material.

The zones formed by the apertures may consist of large or small zones, but normally they are shaped as narrow grooves wherein strings of the flourescent material are incorporated e.g. string having a thickness of 2-6 nm. Depending on the depth of the grooves some of these strings will thus form protrusions on the frontside of the sign plate.

In order to obtain a light effect as strong as possible the illuminated signboard according to the invention preferably comprises at least one reflector placed behind the light source.

In a particularly preferred embodiment of the illuminated signboard according to the invention the housing has the shape of a right-angled triangle seen in cross-sectional view and the light source is placed in the right-angled corner opposite to the sign plate. With a suitable shape of the reflector it is possible to obtain a uniform illumination of the sign plate with such a illuminated signboard.

In another preferred embodiment the housing is shaped as a box and consists of symmetrical frame elements which are connected at the corners and have means for fixing the sign plate and the back plate parallel to one another.

Such a construction ensures a high degree of flexibility and makes a quick production of housings of varying sizes possible.

The illuminated signboard preferably comprises edge elements surrounding the edges of the signboard and co-operating with the above-mentioned fixing means in order to facilitate easy replacement of the sign plate in a signboard of the above-mentioned type.

In the following the invention will be described in further detail with reference to the drawing wherein

Fig. 1 shows a preferred embodiment of an illuminated signboard according to the invention in vertical sectional view.

Fig. 2 shows part of another preferred embodiment of the illuminated signboard according to the invention also in vertical sectional view.

Fig. 3 shows a sign plate of an illuminated signboard according to the invention in perspective view and

Fig. 4 shows the sign plate according to Fig. 3 in cross sectional view along the line IV-IV.

The illuminated signboard shown in Fig. 1 comprises a profile member 1 which is right-angled in cross-sectional view. The profile member 1 comprises a bottom plate 2 and a back plate 3. At the free edge

the bottom plate 2 has a groove 4 and the back plate 3 has a corresponding groove 5. The grooves 4 and 5 surround the edge of a sign plate 6. A socket 7 for a UV fluorescent tube 8 is placed in the housing 1. Between the UV fluorescent tube 8 and the profile 1 a reflector 9 is provided. Furthermore, the illuminated signboard comprises end walls 10 which together with the profile member 1 and the sign plate 6 form a closed compartment.

The illuminated signboard shown in Fig. 2 comprises a back plate 20 and a sign plate 21 situated parallel to the back plate. The back plate 20 to which a light source 22 is attached is connected with a frame profile 23 along the edges. The sign plate 21 is connected with the frame profile 23 along the edges. The sign plate 21 is connected with the frame profile 23 by means of an edge element 24.

The illuminated signboard shown in Fig. 3 and Fig. 4 comprises a UV translucent plate 30, the upper of which is covered by a UV non-translucent coating 31. The coating 31 is cut away in string shaped zones 32 and cut grooves 33 are made in the plate 30. Strings 34 of a fluorescent plastics material are incorporated in said grooves. The space between the grooves 33 is covered with a layer of adhesive film 35 in the illustrated embodiment.

By placing the sign plate shown in Fig. 3 and Fig. 4 in the illuminated signboard according to Fig. 1 or Fig. 2, the UV light emitted from the light sources 8 and 22 will only be capable of penetrating the sign plate in the zones corresponding to the grooves 33. The light will penetrate into the strings 34 of fluorescent plastics material and a strong, bright light will be emitted from the material. Accordingly the letter on the sign plate will appear with great clarity.

C l a i m s

1. An illuminated signboard comprising a housing with a sign plate made of UV translucent material carrying a text or design and a UV light source placed in the housing for illuminating the rear side of the sign plate characterized in that the non-translucent layer is apertured in zones corresponding to said text or design, and that a material which becomes fluorescent when subjected to the influence of UV-light is placed in the zones formed by the apertures.
2. An illuminated signboard according to claim 1 characterized in that the UV non-translucent layer consists of a coating on the front of the UV translucent plate.
3. An illuminated signboard according to claim 2 characterized in that the coating consists of a self adhesive coloured film.
4. An illuminated signboard according to claim 2 characterized in that the coating consists of a colour layer.
5. An illuminated signboard according to claim 1 characterized in that the apertured zones consist of grooves extending into the UV translucent plate.
6. An illuminated signboard according to claim 1 characterized in that the wavelength of the light source is about 315-400nm.
7. An illuminated signboard according to claim 1 characterized in that the fluorescent plastics material placed in the zones formed by the apertures is string shaped.
8. An illuminated signboard according to claim 1 characterized in that it also comprises a reflector placed behind the light source.
9. An illuminated signboard according to claim 1 charac-

a c t e r i z e d in that the housing has the shape of a right-angled triangle seen in cross-sectional view and that the light source is placed close to the right-angled corner and opposite to the sign plate.

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10. An illuminated signboard according to claim 1 c h a r a c -  
t e r i z e d in that the housing is shaped as a box and is  
composed of symmetrical frame elements which are connected at the  
corners and have means for fixing the sign plate and a back plate  
10 parallel to one another.

11. An illuminated signboard according to claim 10 c h a r a c -  
t e r i z e d in that it also comprises edge elements which  
surround the edges of the sign plate.

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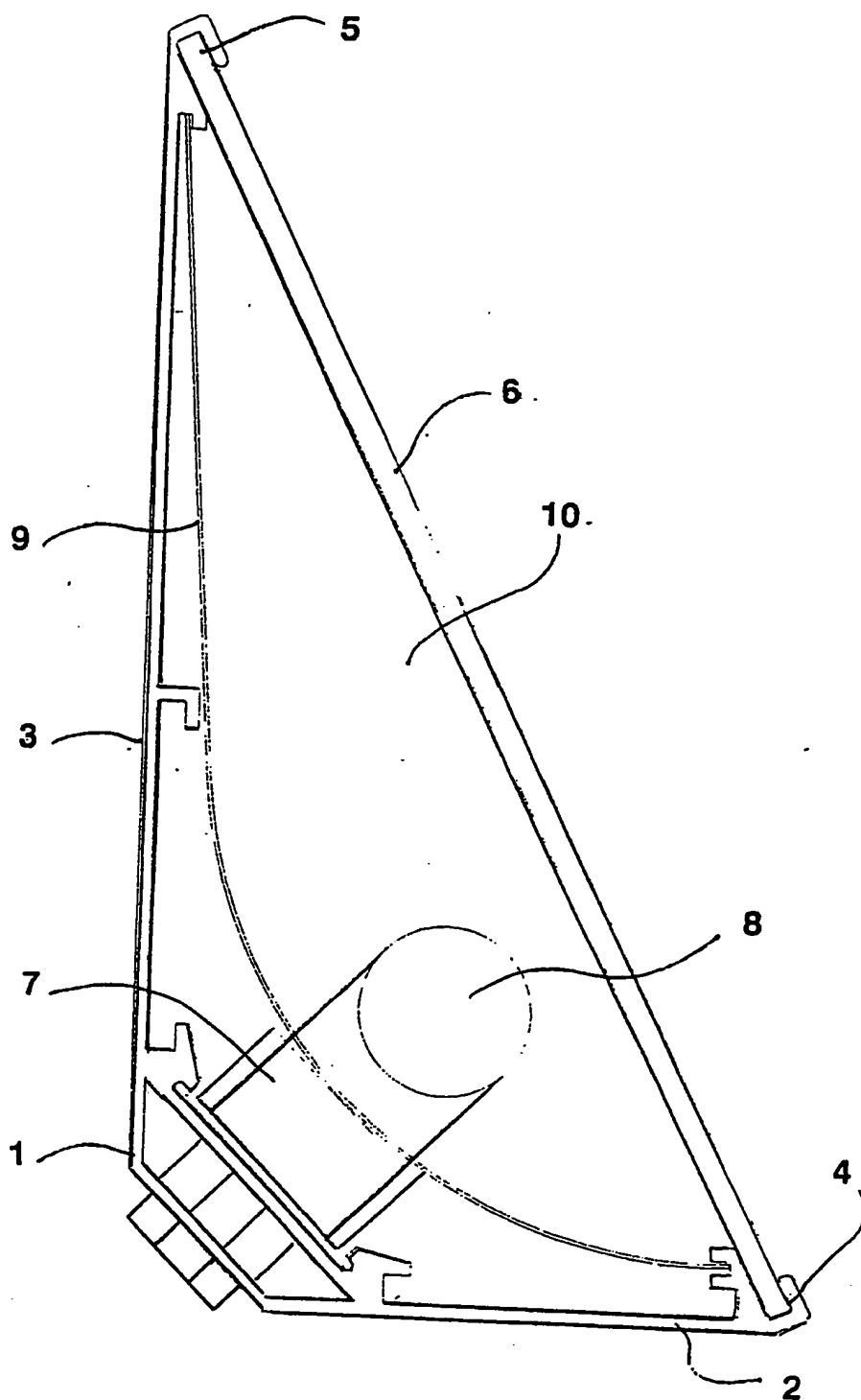
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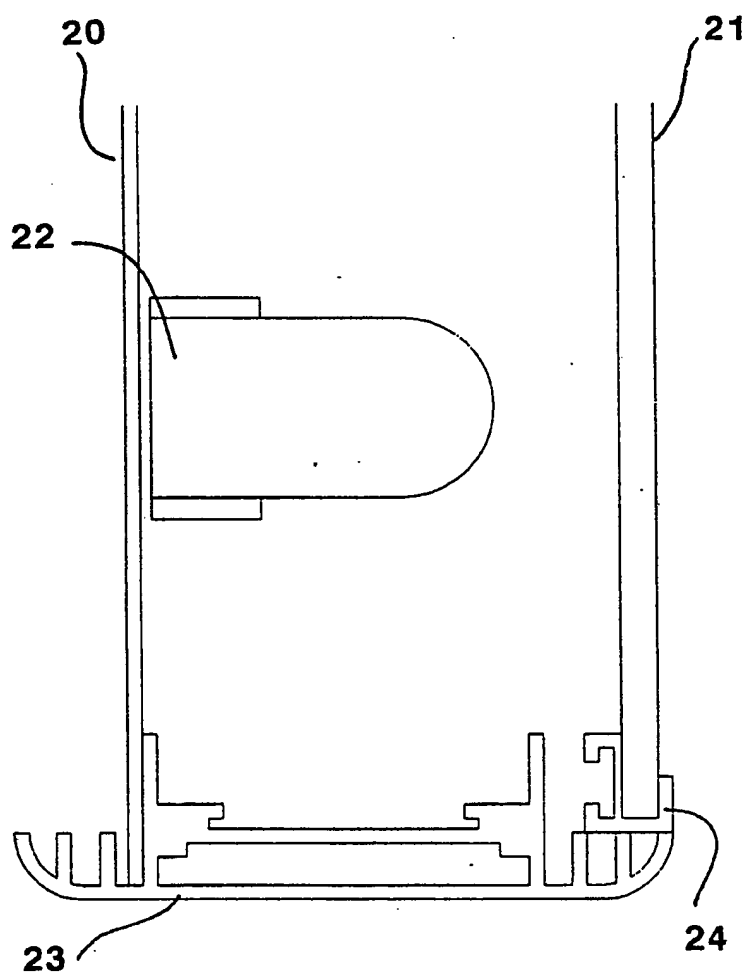
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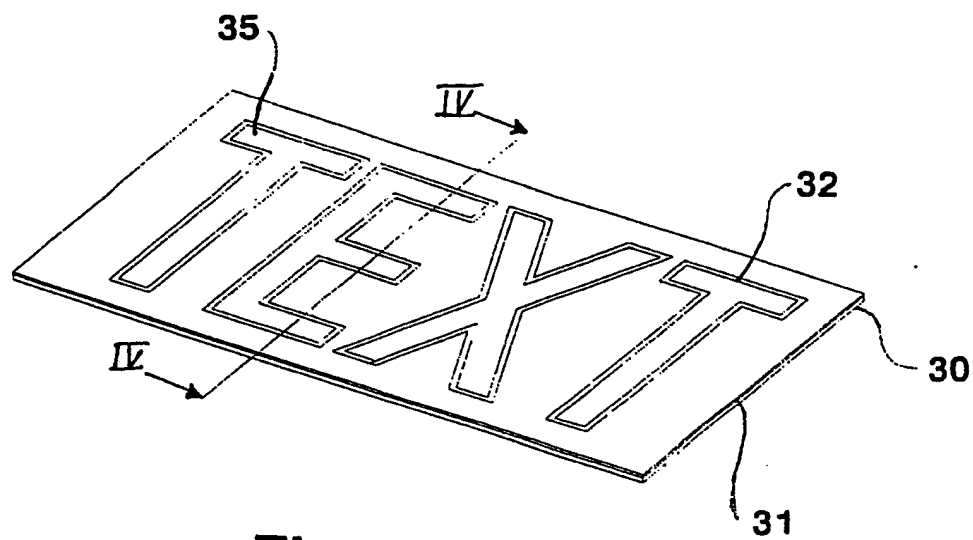
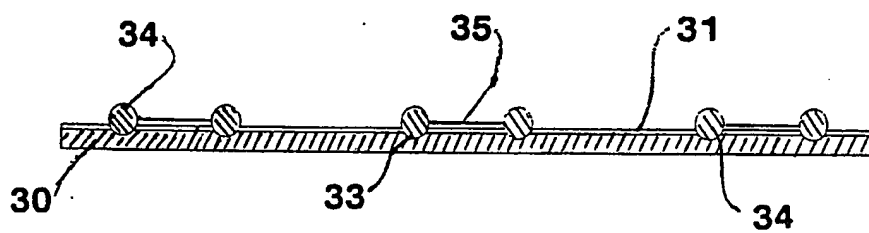
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**Fig. 1**

2/3

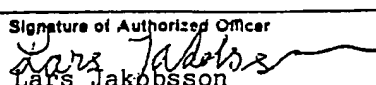
**Fig. 2**

3/3

**Fig. 3****Fig. 4**

# INTERNATIONAL SEARCH REPORT

International Application No PCT/DK88/00149

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC <sup>4</sup>		
G 09 F 13/20		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
IPC 4 US C1	G 09 F 13/00-14, 13/20 40:134, 542, 543	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched *		
SE, NO, DK, FI classes as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT *</b>		
Category *	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	FR, A, 2 054 877 (ARFINA ANSTALT FÜR CONTINENTALE UND ÜBERSEEFINANZINTERESSEN)	1-7
Y	7 May 1971	8-11
Y	DE, A1, 3 219 064 (HILDEBRAND, PETER-RENE) 24 November 1983	1-11
Y	CH, A, 256 732 (HANS KLINGNAUER) 1 March 1949	1-11
Y	AU, A, 134 019 (RUSSELL NEWSOME PROBERT) 3 July 1947.	8, 9
Y	FR, A, 2 138 495 (ERIZE, ROGER) 5 January 1973	9
Y	US, A, 3 235 989 (J.R. BROOKS) 22 February 1966	10, 11
	.../...	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: <sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>		
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
Y	US, A, 3 978 599 (BERGER) 7 September 1976 & FR, 2296235 DE, 2557821 JP, 51092200	10, 11
P	US, A, 4 711 044 (DANJELL) 8 December 1987	1-7
P	GB, A, 2 195 486 (ZIGN LITE SCANDINAVIA A/S) 7 April 1988 & SE, 8703297-5	1-7